CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1. A structural panel for forming sea walls, barrier walls and the like, fabricated of synthetic resin material for driving into soils, comprising:

said structural panel being elongated and of constant size and shape along its length and characterized by having been extruded lengthwise;

said structural panel including in cross section:

a central wall section including an inner surface, an outer surface, and opposed side wall sections co-planar with said central wall section;

a male locking element disposed on and extending laterally from one of said side wall sections, a female locking element disposed on and extending laterally from the other of said side wall sections, said female locking element being configured to slidably receive and retain said male locking element of a duplicate structural panel; and

first and a second strengthening flanges integrally formed on said inner surface, said first and second strengthening flanges being both substantially perpendicular to said central wall section and substantially parallel to each other, said first and second strengthening flanges extending along said length of said structural panel.

2. The structural panel of claim 1, further including a strengthening member encased in said material and shielded from contact with the outside environment.

3. The structural panel of claim 2, wherein said strengthening member comprises metal, said strengthening member being U-shaped in cross section, and wherein said strengthening member is disposed in a similarly U-shaped portion of said structural panel formed by said first and second strengthening flanges and said central wall section.

4. The structural panel of claim 3, wherein said strengthening member comprises solid sheet metal.

5. The structural panel of claim 4, wherein said strengthening member is comprised of material selected from the group consisting of: steel, galvanized steel and aluminum.

6. The structural panel of claim 3, wherein said strengthening flanges each include a distal edge, and further including a secondary flange extending lengthwise from said distal edge of each of said strengthening flanges such that said secondary flanges are substantially perpendicular to said strengthening flanges.

7. The structural panel of claim 3, further comprising:

a first plurality of retention apertures disposed along the length of said first strengthening flange;

a second plurality of retention apertures disposed along the length of said second strengthening flange; and

wherein said retention apertures are configured to receive retention means, said retention means being configured to retain said structural panel in a fixed position in relation to the soils into which said structural panel is driven.

8. A barrier wall comprising a series of structural panels of the type described in claim 7, wherein said retention means further comprise:

an anchor bar configured to pass through one of said retention apertures of each said first and second pluralities of retention apertures such that said anchor bar is disposed substantially parallel to said central wall section and substantially perpendicular to said first and second strengthening flanges;

an anchor sheet configured to be securely attached to said anchor bar; and

wherein said anchor sheet is connected to said structural panel by said anchor bar such that said anchor sheet extends outwardly into the soils disposed behind said structural panel, thereby securing said structural panel adjacent the soils.

9. The structural panel of claim 3, wherein said strengthening member is comprised of expanded metal, said expanded metal defining a plurality of perforations.

10. The structural panel of claim 9, further comprising:

a first plurality of retention apertures disposed along the length of said first strengthening flange;

a second plurality of retention apertures disposed along the length of said second strengthening flange; and

wherein said retention apertures are configured to receive retention means, said retention means being configured to retain said structural panel in a fixed position in relation to the soils into which the structural panel is driven.

11. The structural panel of claim 10, wherein said retention means further comprise:

an anchor bar configured to pass through one of said retention apertures of each said first and second pluralities of apertures such that said anchor bar is disposed substantially parallel to said central wall section and substantially perpendicular to said first and second strengthening flanges;

an anchor sheet configured to be securely attached to said anchor bar; and

wherein said anchor sheet is connected to said structural panel by said anchor bar such that said anchor sheet extends outwardly into the soils disposed behind said structural panel, thereby securing said structural panel adjacent the soils.

12. The structural panel of claim 9, wherein each of said retention apertures of said first and second pluralities of retention apertures extends through one of said perforations of said expanded metal such that said strengthening member is encapsulated within said structural panel.

13. The structural panel of claim 9, wherein said expanded metal is comprised of material selected from the group consisting of: steel and galvanized steel.

14. The structural panel of claim 1, wherein said strengthening member comprises fiberglass, said strengthening member being U-shaped in cross section, and wherein said strengthening member is disposed in a similarly U-shaped portion of said structural panel formed by said first and second strengthening flanges and said central wall section.

15. The structural panel of claim 14, wherein said strengthening member is perforated.

16. A method of installing a driven wall structure for retaining soils, the wall including a means for retaining the wall in a fixed position relative to the soils, a series of elongated structural panels each having an upper end portion and a lower end portion, opposed inner and outer surfaces, elongated opposed side edges shaped for slidably connecting to the side edge of an adjacent structural panel, and at least one strengthening flange extending from the inner surface, comprising the steps of:

joining one of the opposed side edges of each structural panel to one of the opposed side edges of a previously driven structural panel and driving the lower end portion of each structural panel into the soil, thereby forming the wall structure;

attaching the means for retaining to the strengthening flanges of the structural panels; and

disposing soil both about the means for retaining and adjacent the inner surfaces of the structural panels.

17. The method of claim 16, wherein the means for attaching step further comprises:

passing an anchor bar through the strengthening flanges such that the anchor bar is substantially parallel to the wall structure;

securing an anchor sheet to the anchor bar, thereby securing the anchor sheet to the wall structure; and

extending the anchor sheet outwardly from the inner surface of the wall structure such that the anchor sheet is substantially perpendicular to the wall structure and rests on the existing soil.

18. The method of claim 16, wherein the means for attaching step further comprises:

securing a plurality of anchor members to the strengthening flanges, each anchor member having a proximal end secured to one of the strengthening flanges and a distal end extending outwardly from the wall structure;

securing the distal end of each anchor member to an anchor wall, the anchor wall being substantially parallel to the wall structure.

19. A driven wall structure for retaining soil, comprising:

a plurality of structural panels, each said panel including in cross section:

a central wall section including an inner surface, an outer surface, a first side wall section, and a second side wall section;

a male locking element disposed on and extending laterally from said first side wall section, a female locking element disposed on and extending laterally from said second side wall section, said female locking element being configured to slidably receive and retain said male locking element; and

at least one strengthening flange integrally formed on said inner surface, said strengthening flange being substantially perpendicular to said central wall section and extending along said length of said structural panel;

said plurality of structural panels being slidably connected by said male locking element and said female locking element of adjacent said structured panels;

a plurality of anchor bars extending through said strengthening flanges such that said anchor bars are substantially parallel to both the wall structure and other said anchor bars;

a plurality of anchor sheets, each said anchor sheet being securely attached to one of said anchor bars and extending outwardly from said wall structure; and

wherein the soil is disposed about said anchor sheets such that the weight of the soil retains the wall structure in a desired position.

20. The wall structure of claim 19, wherein said structural panel further comprises a strengthening member comprised of expanded steel, said strengthening member being substantially L-shaped in cross-section, and wherein said strengthening member is disposed in a similarly L-shaped portion of said structural panel formed by said strengthening flange and a portion of said central wall section.

21. The wall structure of claim 20, wherein said structural panel is comprised of a material selected from the group consisting of: polyvinyl chloride, polypropylene and polyethylene.

22. The wall structure of claim 20, wherein said strengthening member has a thickness of approximately .010 to .750 inches.

23. The wall structure of claim 19, wherein said structural panel further comprises:

a first and a second strengthening flange; and

a strengthening member comprised of metal, said strengthening member being U-shaped in cross section, and wherein said strengthening member is disposed in a similarly U-shaped portion of said structural panel formed by said first and second strengthening flanges and a portion of said central wall disposed therebetween.

24. The wall structure of claim 23, wherein said strengthening member is further comprised of expanded metal, said expanded metal defining a plurality of perforations, and wherein each of said anchor bars extends through said perforations such that said strengthening member is encapsulated within said structural panel.

25. The wall structure of claim 23, wherein said strengthening member is comprised of a material selected from the group consisting of: steel and galvanized steel.

26. The wall structure of claim 19, wherein said structural panel further comprises:

a first and a second strengthening flange; and

a strengthening member comprised of fiberglass, said strengthening member being U-shaped in cross section, and wherein said strengthening member is disposed in a similarly U-shaped portion of said structural panel formed by said first and second strengthening flanges and a portion of said central wall disposed therebetween.

27. A barrier wall comprising:

a series of duplicate structural panels positioned in edge-to-edge interlocked relationship, formed of resin material, and

a strengthening sheet encased within said resin material of each said panel so that said sheet provides additional strength to said resin material and is shielded from contact with the atmosphere.

28. The barrier wall of claim 27, wherein said strengthening sheet is formed of metal, said sheet defining an array of perforations there through.

29. The barrier wall of claim 28, wherein said sheet is formed of expanded metal.

30. The barrier wall of claim 28, wherein said connection means comprises anchor bars mounted to said panels, and said anchor sheets are connected to said anchor bars.

31. The barrier wall of claim 27, and further including anchor sheets extending from said panels for burying in soil, and connection means connecting said anchor sheets to said panels.

32. The barrier wall of claim 27, and further including anchor sheets of open net configuration extending from said panels for burying in soil to hold the barrier wall upright.